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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/622,376	07/18/2003	James W. Waite	09131.0018	4368
22852	7590	07/06/2005		
FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER LLP 901 NEW YORK AVENUE, NW WASHINGTON, DC 20001-4413			EXAMINER TSAI, CAROL S W	
			ART UNIT 2857	PAPER NUMBER

DATE MAILED: 07/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/622,376	WAITE ET AL.	
	Examiner Carol S. Tsai	Art Unit 2857	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 02 May 2005.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-49 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1,8-13,29 and 37-49 is/are rejected.
- 7) Claim(s) 2-7,14-28 and 30-36 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 18 July 2003 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2/18/2005.
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Group I, claims 1-37 in the reply filed on May 2, 2005 is acknowledged. The traversal is found persuasive.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

3. Claim 37 is rejected under 35 U.S.C. 102(e) as being anticipated by U. S. Publication 2004/0070399 to Olsson et al.

Olsson et al. disclose a line locator, comprising means for determining a signal strength (see paragraph 0045); and means for determining a signal direction (see paragraph 0045).

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4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 38, 44, and 47-49 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 4,942,360 to Candy.

With respect to claims 38, 44, and 47-49, Candy discloses a locator receiver, comprising: a first digital phase-locked loop (PLL 34 shown on Fig. 3) with a first numerically controlled oscillator coupled to receive a signal and provide a first phase related to a first frequency; and a second digital phase-locked loop (PLL 35 shown on Fig. 3) with a second numerically controlled oscillator coupled to receive the signal and provide a second phase related to a second frequency (see col. 8, lines 17-40 and col. 9, lines 48 to col. 10, line 53).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1, 8-13 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Publication 2004/0070399 to Olsson et al. in view of U. S. Patent No. 6,310,579 to Meredith.

With respect to claims 1, 9-11, 13, and 29, Olsson et al. disclose a locator receiver,

comprising: at least one processing channel including an electromagnetic field detector, an analog processor coupled to receive signals from the electromagnetic field detector, and a digital processor coupled to receive signals from the analog processor and calculate a signal strength parameter and a modulated signal (see paragraphs 0011-0013, 0029, and 0035).

Olsson et al. do not disclose the digital processor including an analog-to-digital converter, a digital phase-locked loop coupled to receive the output signal from the analog-to-digital converter and provide the signal strength parameter, and a nested digital phase-locked loop coupled to the phase-locked loop to provide the modulated signal.

Meredith teaches teach the digital processor including an analog-to-digital converter, a digital phase-locked loop coupled to receive the output signal from the analog-to-digital converter and provide the signal strength parameter, and a nested digital phase-locked loop coupled to the phase-locked loop to provide the modulated signal (see Fig. 2 and col. 3, line 46 to col. 4, line 14).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Olsson et al.'s method to include the digital processor including an analog-to-digital converter, a digital phase-locked loop coupled to receive the output signal from the analog-to-digital converter and provide the signal strength parameter, and a nested digital phase-locked loop coupled to the phase-locked loop to provide the modulated signal, as taught by Meredith, in order to measure the signal strength of the signal provided on the line from the signal splitter at a desired receive frequency (see col. 4, lines 6-8).

As to claim 8, Olsson et al. also disclose a program gain amplifier (see paragraphs 0035 and 0068).

As to claim 12, Olsson et al. also disclose the buried object being a marker (see paragraph 0004).

8. Claims 39, 45, and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Candy in view of U. S. Patent No. 5,260,659 to Flowerdew et al.

As noted above, with respect to claims 39, 45, and 46, Candy disclose the claimed invention, except for a signal direction being determined from a comparison of the first frequency multiplied by a first integer and the second frequency multiplied by a second integer.

Flowerdew et al. teach a signal direction being determined from a comparison of the first frequency multiplied by a first integer and the second frequency multiplied by a second integer (see col. 3, lines 41-54).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Candy's method to include a signal direction being determined from a comparison of the first frequency multiplied by a first integer and the second frequency multiplied by a second integer, as taught by Flowerdew et al., in order that the phases can be multiplied and compared to determine the direction of current flow in the cable (see col. 4, lines 60-62).

9. Claims 40-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Candy in view of U. S. Patent No. 4,723,216 to Premerlani.

As noted above, Candy disclose the claimed invention, except for first digital phase-

locked loop updating the phase according to the loop equations $\theta(n+1) = \theta(n) + \alpha e(n) + f(n)$ and $f(n+1) = f(n) + \beta e(n)$.

Premerlani teaches first digital phase-locked loop updating the phase according to the loop equations (see col. 2, lines 27-39; col. 3, line 63 to col. 7, line 30).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Candy in combination with Premerlani's method to include first digital phase-locked loop updating the phase according to the loop equations $\theta(n+1) = \theta(n) + \alpha e(n) + f(n)$ and $f(n+1) = f(n) + \beta e(n)$, as taught by Premerlani, in order to determine the frequency deviation of the sampling signal from the input signal and, thereafter, modulate the sampling signal such that the frequency of the sampling signal is maintained in constant proportion to the frequency of the input signal (see col. 4, lines 34-39).

Allowable Subject Matter

10. Claims 2-7, 14-28, and 30-36 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Hartmeier discloses a phase locked loop system for generating a line-locked clock signal

for a television signal processing system includes an analog phase-locked loop nested within a digital phase locked loop.

Walton discloses metal detection apparatus comprising an oscillator circuit including an inductive detection coil and a detector for rectifying the output of the oscillator circuit synchronously with the frequency of oscillation.

Rider et al. disclose a system for use in determining the location and orientation of concealed underground objects and, more particularly, to an improved locator system having a unique and improved interface with an operator.

Peterman et al. disclose an underground pipe and cable locator for continuous depth readings comprising a top and bottom receiver antenna sensor each connected to respective amplifier channels.

Contact Information

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carol S. W. Tsai whose telephone number is (571) 272-2224. The examiner can normally be reached on Monday-Friday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S. Hoff can be reached on (571) 272-2216. The fax number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

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applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 886-217-9197 (toll-free).



Carol S. W. Tsai
Primary Examiner
Art Unit 2857

Cswt
July 05, 2005